Accomplishments

Activity	FY 2003 Accomplishments	FY 2004 Accomplishments	FY 2005 Accomplishments	FY 2006 Accomplishments
High Temperature Superconductivity	Increased the capability to reproducibly fabricate a 10-meter length of Second Generation HTS wire to carry 50 amps of electricity and 1-meter lengths that carry 100 amps from a 40-amp base	Completed testing of 10 MVA superconducting transformer in operation on the Wisconsin Electric Power Company grid	Completed the manufacture of a 200m superconducting power cable for American Electric Power (AEP)	Operated a first-of-a-kind superconducting power cable on the electric grid for 240 hours
Visualization and Control		Installed and operated a prototype wide area measurement system in the Nation's Eastern Interconnection with realtime synchronized measuring instruments that feed data into two data archiving and analysis locations	• Installed four additional data concentrators at four different data archiving and analysis locations, achieving a prototype wide area measurement system in the Nation's Eastern Interconnection consisting of six fully functioning data archiving and analysis locations installed at six different utilities • Completed field hardware installation at a cumulative total of at least 100 commercial, industrial and/or municipal customers participating in the demand response and load conservation network in Connecticut, and reduce peak demand (kilowatt hours) in real-time by 5-8% on average (as compared to non-curtailed kilowatt hour consumption) for all participating customers, thereby improving the energy efficiency of electricity usage	Facilitated the installation and operation of 30 additional measurement units and 2 additional archiving and analysis locations in a real-time measurement network, for a cumulative total of 80 measuring units and 8 archiving and analysis locations
Energy Storage Power and Electronics	Supported the field test of a 100kW lithium battery system for 700 hrs at a utility site	Tested and evaluated the performance of a 500kW/750kWh sodium sulfur battery (first in U.S) installed at an American Electric Power site for six months to determine technical and economic performance	Complete the manufacture of and factory testing on a 2MW/2MWh zinc-bromine battery system (consisting of four 500kW / 500kWh units) for supplying extra power during peak load conditions at a utility substation	Commissioned three pioneering energy storage systems in collaboration with the California Energy Commission and collect preliminary technical and economic data
Renewable and Distributed Systems Integration	• Completed 4,000 hour field test of ceramic composite shroud components to demonstrate performance and emission benefits to a gas turbine • Completed the 12 Beta field test units of high efficiency natural gas-fired heat pump (60 percent better than pulse combustion furnace) and installed at field test sites hosted by major U.S. Gas Utilities • Contracted with three companies to support research on demonstrating a 5 percent increase in efficiency for an advanced microturbine	• Completed final design and initiate field testing of low emission technology with less than 7 ppm NO_X • Completed and demonstrated heating coefficient of performance of 1.4 for commercial introduction of a thermally activated system (approximately 40 percent more efficient than a conventional heating system) • Demonstrated 6 percentage point increase in efficiency for an advanced reciprocating engine • Completed final design and initiated field testing an evaluation of a complete, fully functional integrated CHP system consisting of a turbine, absorption chiller and control system	• Demonstrated emission levels of 0.25 lbs/MWh from a turbine combustion system • Completed a case study on a CHP installation that uses heat from microturbine to provide plate tank heating and sludge drying at an industrial facility, contributing to the PART long-term measure of developing a 70 percent efficient CHP integrated system • Completed and documented two DE/CHP demonstration projects within the high tech industry, contributing to the PART long-term measure of developing a 70 percent efficient CHP integrated system • Reduce by 10% the total time required by OE to complete its FY 2006 CFO, OMB and Congressional budget submissions as compared to its FY 2005 budget submissions	• Developed one packaged CHP system which operates at 70+% efficiency • Maintained total Research and Development Program Direction costs in relation to total Research and Development costs of less than 12%

Accomplishments				
Activity	**FY 2003 Accomplishments**	**FY 2004 Accomplishments**	**FY 2005 Accomplishments**	**FY 2006 Accomplishments**
Permitting, Siting and Analysis				
Infrastructure, Security and Energy Restoration				